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WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada



U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and
BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES

AS OF
MAR. 1, 1977

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: SNOW COURSE MEASUREMENTS BY A SURVEY TEAM IN UTAH'S WASATCH RANGE.
ORC-254-10

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, 6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1220 S.W. Third Ave., Portland, Oregon 97204
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia





You may have less Irrigation water this year than ever before.

SNOW COURSE MEASUREMENTS MADE ON MARCH 1, 1977 CONTINUE TO INDICATE THAT MANY AREAS WILL HAVE SEVERE TO CRITICAL WATER SHORTAGES. STUDY THE ATTACHED WATER SUPPLY FORECAST CAREFULLY FOR STREAM FLOW AND/OR RESERVOIR STORAGE FIGURES THAT CONCERN YOUR AREA. KEEP IN TOUCH WITH YOUR IRRIGATION DISTRICT OR OTHER OFFICIALS FOR ESTIMATES OF THE SUPPLY AVAILABLE FOR YOU. YOU MAY FIND YOU'LL NEED TO CHANGE CROPS, PLANTED ACREAGE, TIMING OF WATER APPLICATION OR EFFICIENCY OF YOUR WATER DISTRIBUTION SYSTEM. THESE ARE SOME OF THE EARLY DECISIONS AND PLANS YOU MAY HAVE TO MAKE:

1. Change to crops which require less water.
2. Reduce the crop acreage. Naturally, this will affect the fertilizer you order and the amount of seed you buy. Be sure unplanted land has cover crops to prevent wind erosion.
3. Check out your irrigation systems carefully. Make certain that ditches have no water-wasting weeds or debris to slow delivery; that sprinkler heads don't have leaks, pipes have tight connections and pumps work properly. If new parts or equipment are needed, purchase them soon.
4. Plant only the best land - it makes most efficient use of water. If your soil has been mapped, local Soil Conservation Service personnel can guide you. If not mapped, they can still give you general information.
5. Maintain close contact with the Soil Conservation Service or your local Conservation District for the latest water supply forecasts, and for soil information. SCS has just published water conservation TIPS pamphlets for irrigators, farmers and ranchers. Get copies.
6. Maintain close contact with the Agricultural Stabilization and Conservation Service county office. Funds for cost sharing on special water stretching practices may be made available because of the drought situation. ASCS also administers the Federal Disaster Assistance program.
7. Do the same with your closest Farmers Home Administration office. Special loans may become available.
8. Do the same with the local Cooperative Extension Service office for current information on crops, feed supply and marketing.

SCS, ASCS AND FMHA ARE LISTED IN THE PHONE BOOK UNDER "U.S. GOVERNMENT, AGRICULTURE, DEPARTMENT OF." THE EXTENSION SERVICE IS USUALLY LISTED WITH LOCAL COUNTY OFFICES.

WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

ISSUED

MARCH 1, 1977

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
R.M. DAVIS, ADMINISTRATOR

WATER SUPPLY OUTLOOK

1977 SNOWMELT SEASON
MARCH 1, 1977

THE WATER SUPPLY OUTLOOK REMAINS VERY POOR IN NEARLY ALL AREAS OF THE WEST. THE FIRST THREE WEEKS OF FEBRUARY WERE VERY DRY, AND MANY STREAMFLOW FORECASTS HAVE BEEN REVISED DOWNWARD. SNOWMELT RUNOFF IN MOST RIVERS IS FORECAST TO BE THE LOWEST ON RECORD, AND SERIOUS WATER SUPPLY SHORTAGES ARE EXPECTED.

Snowfall on the mountains of the West was below normal during February, and the water supply outlook is a bit worse than reported last month. The snowpack on most watersheds remains lower than any winter in the snow survey program's history. Forecasts of snowmelt runoff indicate that many new record minimum water yields will be established.

The regularly featured "Prospective Streamflow" map of the western United States, which appears in this report, has been changed in the hope that the snowmelt runoff picture can be displayed more clearly. Nearly the entire west is expecting "Much Below Normal" runoff. In the new system there will be three categories which previously were shown simply as "Much Below Normal."

A wide area of the west is expecting runoff from melting snow to be only 5 to 30 percent of normal. Most of the rest of the rivers will yield at rates from 30 to 60 percent of the long-term average. A small area in Wyoming's Big Horn range and the Black Hills remains the only locality with normal snowpack.

California and Nevada streams heading in the Sierra Nevada continue to be forecast at near record minimum. This second consecutive year of low runoff will exhaust reservoir supplies and many water users will suffer from lack of adequate supplies. Elsewhere, in the Great Basin the outlook is equally poor. Most rivers are expected to yield less than 30% of their average quantities.

The Colorado River system will receive 30 to 60 percent yields from its tributaries. A major exception is in Utah where flows are expected to be less than 30% of average.

The North and South Platte Rivers, Arkansas and Rio Grande systems are forecast to yield from 40 to 60 percent of normal. Similar quantities are expected from the Missouri basin in Montana and Wyoming. As stated above, the Big Horn range and Black Hills in Wyoming continue to have normal snowpacks. The runoff picture there is brighter.

The Columbia River basin expects runoff to fall below any year in the

past 100. Although the snowpack in British Columbia is nearly two-thirds of the March 1 average, many tributaries have their lowest snowpacks on record.

Reservoir storage is depleted in California and Nevada, but near average in most other states. However, the refill season is beginning, and the extremely low runoff forecasts indicate that many reservoirs will not fill during the spring runoff. Consequently, there is expected to be less than normal late season supplemental water available.

The Soil Conservation Service has developed four water conservation brochures which give tips for stretching water for irrigation, pasture and range, crops and soils, and yards and gardens. Copies may be obtained from local Soil Conservation Service and conservation district offices.

ALASKA

Heavy snow and no snow typify the variable conditions that prevail on watersheds across Alaska. In south central, higher elevations of the Chugach, Talkeetna, Alaska and Wrangell ranges remain covered by an abnormally heavy snowpack. Meanwhile, valley bottoms and mountain foothills are generally near or below average with a few sites being completely bare.

Ship Creek near Anchorage is a typical example. Maximum of record snowpack was measured on its headwaters, midway in its watershed is about average, and the valley bottom is well below average.

The Susitna Valley is an exception where well above-average snow conditions generally prevail. The Chena drainage is far below, but runoff is expected to be greater than recorded during the April-July period one year ago.

The Upper Yukon basin in Canada is well below normal also, but snow

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS

March 1, 1977

MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:		MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:	
	LAST YEAR	AVERAGE		LAST YEAR	AVERAGE
MISSOURI BASIN			SNAKE BASIN		
Jefferson	28	33	Snake above Jackson, Wyo.	22	29
Madison	30	36	Snake above Hiese, Idaho	25	31
Gallatin	46	52	Henry's Fork	26	30
Missouri Main Stem	47	52	Southern Idaho Tributaries	30	31
Yellowstone	45	54	Big and Little Wood	15	12
Shoshone	32	42	Boise	15	16
Wind	22	28	Owyhee	23	22
North Platte	44	46	Payette	17	19
South Platte	55	39	Malheur	12	13
ARKANSAS BASIN			Weiser	22	18
Arkansas	46	46	Burnt	18	18
Cucharas - Purgatoire	89	80	Powder	20	20
RIO GRANDE BASIN			Salmon	16	18
Rio Grande (Colo.)	22	25	Grande Ronde	23	24
Rio Grande (New Mexico)	58	62	Clearwater	30	32
Pecos	135	106	LOWER COLUMBIA BASIN		
COLORADO BASIN			Yakima	29	11
Green (Wyo.)	25	24	Umatilla	12	17
Yampa - White	51	43	John Day	23	25
Duchesne	22	20	Deschutes - Crooked	11	13
Price	26	26	Hood	19	21
Upper Colorado	47	45	Willamette	12	16
Gunnison	35	35	Lewis	7	8
San Juan	22	27	Cowlitz	11	12
Dolores	26	28	PACIFIC COASTAL BASIN		
Virgin	14	18	Puget Sound	12	14
Gila	64	46	Olympic Peninsula	7	10
Salt	45	45	Umpqua - Rogue	14	16
Verde	44	59	Klamath	13	14
GREAT BASIN			Trinity	30	25
Bear	25	25	CALIFORNIA		
Logan	28	26	CENTRAL VALLEY		
Ogden	20	22	Upper Sacramento	20	15
Weber	31	33	Feather	35	25
Provo - Utah Lake	28	31	Yuba	40	25
Jordan	37	38	American	40	25
Sevier	38	36	Mokelumne	50	25
Walker - Carson	84	27	Stanislaus	45	20
Tahoe - Truckee	65	25	Tuolumne	40	20
Humboldt	22	21	Merced	45	20
Lake Co. (Oregon)	16	15	San Joaquin	50	20
Harney Basin (Oregon)	20	22	Kings	45	20
Owens	85	25	Kaweah	40	15
UPPER COLUMBIA BASIN			Tule	100	20
Columbia (Canada)	52	57	Kern	85	25
Kootenai	36	42	<i>Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.</i>		
Clark Fork	33	37			
Bitterroot	31	40	<i>Average is for 1958-72 period. California averages are for the period 1931-70. Based on Selected Snow Courses determined by Distri- bution within the Basin. Length of Record and Repetitive Monthly Measurement Schedules.</i>		
Flathead	46	43			
Spokane	32	32			
Okanogan	34	36			
Methow	15	15			
Chelan	25	31			
Wenatchee	17	20			

conditions north of the Yukon River improved somewhat to near average for this date in the Brooks Range.

ARIZONA

The water supply outlook for Arizona is generally poor. Snow cover is half of normal and spring runoff is predicted to be less than one-third of average.

Although snow cover increased slightly at the higher elevations, most mid- and low-elevation snow packs declined during February. The extremely warm temperatures during the first three weeks of the month melted most of the snow at the lower elevations. The storm of February 25 and cold temperatures since, however, have slowed the snowmelt temporarily. Snow cover now varies from 45% of average on the Salt and Gila Watersheds to 60% on the Verde.

Storm activity increased the last week of February, but precipitation on all watersheds ended up much below average for the month. The Salt and Verde Watersheds received one-half of average, while the Little Colorado and Gila fared only slightly better. Since November 1 all watersheds have received just about half of normal amounts of precipitation.

Soil moisture has improved significantly at the lower elevations due to the recent storm and melting snow. At the higher elevations, however, dry conditions still prevail, and much of the snow water will be absorbed by the soil this year.

Reservoir storage varies from a nearly empty San Carlos Reservoir to above average conditions in Lyman Reservoir. Salt River Project reservoirs are about half full, which is only slightly below normal for this date. The most favorable water supplies occur on the Colorado River, where the combined reservoir storage is now 57% above average.

Melting snow and recent storms have had little effect on streamflow. Combined runoff of the Salt River Project streams was 30% of average during February, and the Gila River flow was only 20% of average. Much below average spring runoff is anticipated this year. For the March through May period streamflow forecasts range from 1/4 of average on the Gila to 1/2 of average on the Verde. The Colorado River is also expected to produce less than half the normal amount of water this year.

With moderate reservoir storage in most areas, water supplies will generally be adequate yet this year. San Carlos, with its nearly empty reservoir, however, will be very short and areas such as the Upper

Gila that are dependent upon direct diversion from live streams, will also be very short. If dry conditions continue throughout next winter, however, most of the state will be short of water next year. Conservation of water is strongly urged this season to reduce the impact on next year.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that February's precipitation was far below normal, extending the dry pattern which has persisted in California since the fall of 1975. With much of the 1977 precipitation season behind us, full relief from the drought cannot come until next winter, even if above normal precipitation should occur in the next two or three months.

Forecasts of snowmelt runoff indicate that streamflow volumes for April through July will be at or below the lowest flows of record in the Central Valley, from the Yuba through the Kern Rivers, and for the West Fork of the Carson River in the Lahontan area. These, and many other streams, will produce their lowest or near lowest flows of record by the end of the water year.

Snowpack water storage remains far below normal. March 1 snow surveys show that only 1 to 4 inches of snow water content accumulated during February. Even though about double the values of one month ago, statewide snow stored water still is 75% below normal.

Precipitation during February was 35% of average for the state, ranging from about 60% at the Oregon border to near zero on the southern San Joaquin Valley floor and the southeast desert areas. The light February precipitation continued the record setting low for this water year, now 35% of average for the October through February period.

Runoff during February was only 12% of average, ranging from near zero in the San Francisco Bay and Central Coastal areas to 35% in the Lahontan area. The Salmon, Trinity, Eel, and Russian Rivers on the North Coast had their lowest flow of record for the water year to date. In the Central Valley, new record low flows for the five-month period were experienced on the Yuba through the San Joaquin Rivers. Statewide streamflow was over 14 million acre-feet below average for the water year to date.

Reservoir storage on March 1 was 55% of average for the state. In the Central Valley, storage was 9.6 million acre-feet, almost 7.9 million acre-feet below the

SELECTED STREAMFLOW FORECASTS

MARCH 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana <u>1/</u>	310	63	April-Sept.	--
UPPER MISSOURI				
Beaverhead near Grant, Montana <u>2/</u>	37	26	April-Sept.	244
Big Hole near Melrose, Montana	270	36	April-Sept.	--
Madison near Grayling, Montana <u>3/</u>	315	66	April-Sept.	575
Gallatin near Gateway, Montana	320	60	April-Sept.	--
Sun at Gibson Dam, Montana <u>4/</u>	290	49	April-Sept.	703
Belt near Monarch, Montana	80	65	April-Sept.	--
Marias near Shelby, Montana <u>5/</u>	200	36	April-Sept.	--
Missouri near Landusky, Montana <u>6/</u>	1,800	38	April-Sept.	4,739
near Williston, North Dakota <u>7/</u>	4,600	39	April-Sept.	11,778
S. Fk. Musselshell above Martinsdale, Montana	34	68	April-Sept.	--
Milk at Eastern Crossing, Montana	195	68	March-Sept.	286
Yellowstone at Yellowstone Lake Outlet, Wyo.	450	55	April-Sept.	955
at Corwin Springs, Montana	1,200	60	April-Sept.	2,453
at Miles City, Montana <u>8/</u>	3,000	47	April-Sept.	6,378
Clarks Fork near Belfry, Montana	370	61	April-Sept.	--
Shoshone below Buffalo Bill Res., Wy. <u>9/</u>	460	56	April-Sept.	1,037
Wind near Dubois, Wyoming	51	50	April-Sept.	146
at Riverton, Wyoming <u>10/</u>	340	51	April-Sept.	736
below Boysen Res., Wyoming <u>11/</u>	500	50	April-Sept.	1,100
Bull Lake Creek near Lenore, Wyoming	120	66	April-Sept.	178
Little Popo Agie near Lander, Wyoming	29	60	April-Sept.	40
Tensleep near Tensleep, Wyoming	38	48	April-Sept.	--
Medicine Lodge near Hyattville, Wyoming	9.1	43	April-Sept.	--
Shell Creek near Shell, Wyoming	53	73	April-Sept.	--
Big Horn near St. Xavier <u>8/</u>	600	32	April-Sept.	2,077
Tongue near Dayton, Wyoming	144	101	April-Sept.	108
No. Fork Powder near Hazelton, Wyoming	8.1	81	April-Sept.	11.1
PLATTE				
North Platte at Northgate, Colorado	95	40	April-Sept.	163
Encampment near Encampment, Wyoming	50	35	April-Sept.	142
Laramie & Pioneer Canal, nr Woods, Wyo. <u>12/</u>	47	37	April-Sept.	81
Big Thompson at Drake, Colorado <u>13/</u>	46	43	April-Sept.	--
Clear at Golden, Colorado <u>14/</u>	51	40	April-Sept.	--
St. Vrain at Lyons, Colorado <u>15/</u>	30	40	April-Sept.	--
Cache LaPoudre near Fort Collins, Colorado <u>16/</u>	118	48	April-Sept.	--
ARKANSAS				
Arkansas at Salida, Colorado <u>17/</u>	155	49	April-Sept.	--
Cucharas near LeVeta, Colorado	8	80	April-Sept.	--
Purgatoire at Trinidad, Colorado	21	55	April-Sept.	--
RIO GRANDE				
Rio Grande near Del Norte, Colorado <u>18/</u>	250	54	April-Sept.	--
at Otowi Bridge, New Mexico <u>19/</u>	210	40	March-July	--
Conejos near Mogote, Colorado <u>20/</u>	90	49	April-Sept.	--
El Vado Res., Inflow, New Mexico	73	38	March-July	--
Pecos at Pecos, New Mexico	34	83	March-July	--
UPPER COLORADO				
Colorado, Grandby Res., Inflow, Colorado <u>21/</u>	116	51	April-Sept.	--
near Dotsero, Colorado <u>22/</u>	675	47	April-Sept.	--
near Cameo, Colorado <u>23/</u>	1,140	48	April-Sept.	--
near Cisco, Utah <u>24/</u>	892	31	April-July	2,029
Lake Powell Inflow, Arizona <u>25/</u>	2,150	31	April-June	5,395
Roaring Fork at Glenwood Springs, Colorado <u>26/</u>	375	53	April-Sept.	--
Uncompahgre at Colona, Colorado	59	44	April-Sept.	--
Cunnison, Blue Mesa Res. Inflow, Colorado <u>27/</u>	347	44	April-Sept.	--

Forecasts in California provided by Department of Water Resources.

Average is for 1958-72 period except California. California is computed for 1921-70 period

Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season

Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS MARCH 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, near Grand Junction, Colorado <u>28/</u>	500	42	April-Sept.	--
Dolores at Dolores, Colorado	100	43	April-Sept.	--
Green at Warren Bridge, Wyoming	175	54	April-Sept.	347
at Green River, Wyoming <u>29/</u>	370	37	April-Sept.	1,222
Flaming Gorge Res. Inflow, Utah <u>27/</u>	375	32	April-July	1,329
at Green River, Utah <u>30/</u>	103	36	April-July	2,251
Big Sandy near Big Sandy, Wyoming	20	35	April-Sept.	62
Yampa at Steamboat Springs, Colorado	123	45	April-Sept.	--
near Maybell, Colorado	450	50	April-Sept.	--
Little Snake near Dixon, Wyoming	115	38	April-Sept.	254
White near Meeker, Colorado	155	52	April-Sept.	--
Strawberry at Duchesne, Utah <u>40/</u>	6.1	11	April-July	--
Duchesne near Tabiona, Utah <u>31/</u>	28	27	April-July	--
at Randlett, Utah <u>40/</u>	15	5	April-July	--
Lakefork below Moon Lake, Utah <u>32/</u>	28	41	April-July	--
Uinta near Neola, Utah	31	35	April-July	59
Whiterocks near Whiterocks, Utah	19	33	April-July	47
Price, Scofield Res. Inflow, Utah <u>33/</u>	8.0	24	April-July	--
Cottonwood near Orangeville, Utah <u>34/</u>	17.8	39	April-July	--
San Juan, Navajo Res. Inflow, New Mexico <u>27/</u>	233	39	April-July	--
near Bluff, Utah <u>35/</u>	303	37	April-July	634
Animas at Durango, Colorado	235	56	April-Sept.	--
LOWER COLORADO				
Virgin near Virgin, Utah	17	35	April-June	23
Little Colorado above Lyman, Arizona	1.3	13	March-June	17
Gila near Solomon, Arizona	21	23	March-May	38
Frisco at Clifton, Arizona	10	21	March-May	18
Salt at Intake, Arizona	75	33	March-May	161
Tonto above Roosevelt, Arizona	6	26	March-May	20
Verde above Horseshoe Dame, Arizona	55	48	March-May	130
GREAT BASIN				
Bear at Utah-Wyoming State Line	40	36	April-July	80
at Harer, Idaho	30	10	April-Sept.	--
Smith's Fork near Border, Wyoming	35	30	April-Sept.	135
Thomas Fork near Wyoming-Idaho State Line	6	19	April-Sept.	40
Logan near Logan, Utah <u>36/</u>	40	35	April-July	114
Ogden, Pine View Res. Inflow, Utah <u>27/</u>	20	8	April-June	93
Weber near Oakley, Utah	41	41	April-June	90
Provo near Hailstone, Utah <u>37/</u>	26	25	April-July	107
Strawberry Res. Inflow, Utah	6.4	14	April-July	38
Utah Lake Net Inflow, Utah	73	35	April-July	--
Big Cottonwood near Salt Lake City, Utah	17.5	49	April-July	--
Beaver near Beaver, Utah	7.1	36	April-July	9.2
Sevier near Hatch, Utah	13.8	34	April-July	25
near Gunnison, Utah	13.0	33	April-July	22
South Fork Humboldt near Dixie Creek, Nevada	15	23	April-July	48
Humboldt at Palisades, Nevada	20	10	April-July	105
Truckee at Farad, California <u>38/</u>	40	15	April-July	59
East Carson near Gardnerville, Nevada	45	23	April-July	64
West Carson at Woodsfords, California	14	27	April-July	17
East Walker near Bridgeport, California <u>39/</u>	8	12	April-August	8
West Walker near Coleville, California	45	31	April-July	50
Donner und Blitzen near Frenchglen, Oregon	31	58	April-Sept.	--
Silvies near Burns, Oregon	14.8	20	April-Sept.	--
Chewaucan near Paisley, Oregon	12	14	March-July	67
Deep above Adel, Oregon	22	28	March-July	--
Bidwell near Ft. Bidwell, California	3	26	April-July	9.2
Owens below Long Valley Res., California	14	23	April-July	32

Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season
Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS MARCH 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia at Birchbank, British Columbia <u>40/</u>	33,000	71	April-Sept.	53,937
at Grand Coulee, Washington <u>40/</u>	40,200	58	April-Sept.	80,974
below Rock Island, Washington	43,600	58	April-Sept.	86,849
Kootenai near Libby, Montana	4,100	55	April-Sept.	8,012
at Leonia, Idaho	4,900	54	April-Sept.	--
Blackfoot near Bonner, Montana	470	46	April-Sept.	--
So. Fk. Flathead nr Columbia Falls, Montana <u>40/</u>	1,450	61	April-Sept.	2,489
Flathead at Columbia Falls, Montana <u>40/</u>	3,800	59	April-Sept.	6,785
near Polson, Montana <u>40/</u>	4,200	55	April-Sept.	8,187
Clark Fork above Missoula, Montana	820	45	April-Sept.	2,649
near Plains, Montana <u>40/</u>	6,200	49	April-Sept.	14,454
at Whitehorse Rapids, Idaho	6,800	48	April-Sept.	--
Bitterroot near Darby, Montana	255	44	April-Sept.	836
Priest near Priest River, Idaho	400	46	April-July	--
Pend Oreille below Box Canyon, Washington	7,200	45	April-Sept.	17,638
Kettle near Laurier, Washington	1,130	60	April-Sept.	--
Spokane at Post Falls, Idaho	915	31	April-Sept.	--
Similkameen near Nighthawk, Washington	610	40	April-Sept.	1,967
Okanogan near Tonasket, Washington	690	40	April-Sept.	2,135
Methow near Pateros, Washington	410	40	April-Sept.	--
Stehekin at Stehekin, Washington	490	54	April-Sept.	--
Chelan at Chelan, Washington <u>43/</u>	625	50	April-Sept.	1,467
Wenatchee at Peshastin, Washington	860	45	April-Sept.	2,134
SNAKE				
Snake above Palisades Res., Wyoming <u>44/</u>	1,200	46	April-Sept.	3,237
near Heise, Idaho <u>45/</u>	1,750	44	April-Sept.	--
near Blackfoot <u>46/</u>	2,000	48	April-July	--
at Weiser, Idaho	3,000	46	April-Sept.	--
Grey's above Palisade, Wyoming	78	20	April-Sept.	477
Salt above Palisade, Wyoming	70	19	April-Sept.	516
Henry's Fork near Ashton, Idaho <u>47/</u>	400	60	April-Sept.	--
Teton near St. Anthony, Idaho	250	57	April-Sept.	--
Big Lost near MacKay, Idaho <u>48/</u>	40	22	April-Sept.	--
Portneuf at Topaz, Idaho	60	64	March-Sept.	--
Salmon Falls Creek nr San Jacinto, Idaho	26	31	March-Sept.	--
Big Wood, Inflow to Magic Res., Idaho <u>49/</u>	55	18	April-Sept.	--
Bruneau near Hot Springs, Idaho	70	31	March-Sept.	--
Boise near Boise, Idaho <u>50/</u>	195	12	April-Sept.	--
Owyhee near Owyhee, Nevada <u>51/</u>	12	18	March-July	85
Owyhee Res. Net Inflow, Oregon <u>27/</u>	60	18	April-Sept.	510
Malheur near Drewsey, Oregon	10.8	15	April-Sept.	--
Payette near Horseshoe Bend, Idaho <u>52/</u>	440	24	April-Sept.	--
Weiser above Crane Creek, Idaho <u>40/</u>	102	20	March-Sept.	--
Burnt near Hereford, Oregon <u>40/</u>	6.6	20	April-Sept.	--
Powder near Sumpter, Oregon	17.9	32	April-Sept.	--
Eagle above Skull Creek, Oregon	64	33	April-Sept.	--
Imnaha at Imnaha, Oregon	135	44	April-Sept.	--
Salmon at Whitebird, Idaho	2,500	36	April-Sept.	--
Lostine near Lostine, Oregon	72	58	April-Sept.	--
Grande Ronde at LaGrande, Oregon	66	42	April-Sept.	246
Clearwater at Spalding, Idaho	3,500	41	April-Sept.	--
LOWER COLUMBIA				
Yakima at CleElum, Washington <u>53/</u>	405	42	April-Sept.	--
near Parker, Washington <u>54/</u>	380	22	April-Sept.	--
Naches near Naches, Washington <u>55/</u>	285	32	April-Sept.	--
Walla Walla, So. Fk. near Milton, Oregon	59	75	March-Sept.	--

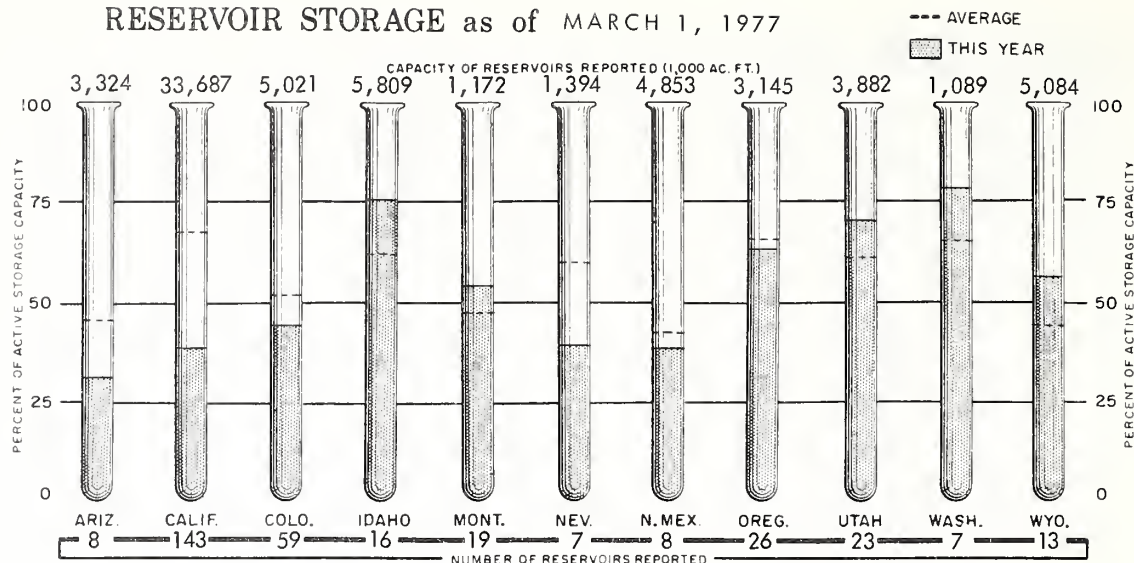
Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS MARCH 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Umatilla at Pendleton, Oregon	104	52	March-Sept.	--
John Day, Middle Fork at Ritter, Oregon	38	35	April-Sept.	--
North Fork at Monument, Oregon	189	35	April-Sept.	--
Crooked near Post, Oregon	18.1	20	April-Sept.	--
Deschutes at Benham Falls, Oregon 40/	380	69	April-Sept.	--
Columbia at The Dalles, Oregon 40/	53,000	51	April-Sept.	122,876
at The Dalles, Oregon 40/	41,000	45	April-July	99,965
McKenzie near Vida, Oregon	786	62	April-Sept.	--
Santiam, South, at Waterloo, Oregon	279	46	April-Sept.	--
North, at Mehama, Oregon 40/	418	48	April-Sept.	--
Clackamas at Estacada, Oregon	442	56	April-Sept.	--
Willamette at Salem, Oregon 40/	2,867	58	April-Sept.	--
Lewis at Ariel, Washington 56/	630	47	April-Sept.	1,333
Cowlitz at Castle Rock, Washington 57/	1,550	56	April-Sept.	3,030
NORTH PACIFIC COASTAL				
Dungness near Sequim, Washington	91	55	April-Sept.	--
Umpqua, No., near Toketee Falls, Oregon 40/	110	66	April-Sept.	--
Rogue at Raygold, Oregon	523	59	April-Sept.	997
Klamath Lake, Net Inflow, Oregon	225	42	April-Sept.	499
Trinity at Lewiston, California	265	43	April-July	370
CALIFORNIA CENTRAL VALLEY 40/				
Sacramento, Inflow to Shasta, California	900	51	April-July	1,135
Feather near Oroville, California	600	32	April-July	565
Yuba at Smartville, California	200	19	April-July	279
American, Inflow to Folsom Res., Calif.	225	17	April-July	312
Cosumnes at Michigan Bar, California	12	9	April-July	15
Mokelumne, Inflow to Pardee Res., Calif.	100	21	April-July	122
Stanislaus, Inflow to Melones Res., Calif.	200	28	April-July	199
Tuolumne, Inflow to Don Pedro Res., Calif.	330	28	April-July	330
Merced, Inflow to Excheque Res., Calif.	165	27	April-July	168
San Joaquin, Inflow to Millerton Lake, Calif.	270	23	April-July	350
Kings, Inflow to Pine Flat Res., California	230	20	April-July	303
Kaweah, Inflow to Terminus Res., California	60	22	April-July	75
Tule, Inflow to Success Res., California	5	8	April-July	13
Kern, Inflow to Isabella Res., California	95	23	April-July	104
ALASKA				
Yukon River at Eagle, Alaska	27,400	80	April-July	35,920
at Ruby, Alaska	64,000	95	April-July	58,420
Porcupine River at Ft. Yukon, Alaska	7,800	108	April-July	8,949
Little Chena near Fairbanks, Alaska	67	72	April-July	69
Chena River at Fairbanks, Alaska	382	68	April-July	348
Salcha River near Salchaket, Alaska	500	65	April-July	428
Ship Creek near Anchorage	80	135	April-July	54
So. Fk. Cambell Creek at Canyon Mouth near Anchorage	19.5	130	April-July	12.5

Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
Explanatory Notes on Forecasts listed on Inside Back Cover.

RESERVOIR STORAGE as of MARCH 1, 1977



March 1 normal. Most major reservoirs are expected to have record low volumes in storage this year as spring and summer inflows are forecasted to remain far below normal due to lack of snowmelt to replenish these surface storage supplies.

aren't that fortunate. The Arkansas and Rio Grande Basins have poor carryover.

COLORADO

Seventy-five percent of the snow courses in Colorado have a record low snowpack as of March 1. The snowpack in the Rabbit Ears and La Veta Pass areas was most improved by the month-end storm, although most mountain areas of the state received some snow from the storm. In spite of the storm, statewide the snowpack still remains the lowest on record. Some snow courses indicate less than half the minimum of record.

The Sangre de Cristo Mountains south from La Veta Pass have the highest percentage snowpack in the state. This condition extends south into New Mexico and has improved the runoff outlook to some extent. The Rabbit Ears Pass area also received considerable snow from the last storm. As much as 30 inches of new snow was recorded.

Summer streamflow will be extremely short this summer. Most forecasts are near the minimum of record. Clear Creek is forecast to yield only 40% of its normal. The Arkansas is expected to yield 49% of its normal, while the Cucharas, with its heavier snowpack, is expected to flow at 80% of average. The Rio Grande and Colorado are forecast at 54 and 48 percent, respectively.

Water users under reservoir systems in the South Platte should have fair summer supplies because of the excellent storage carryovers. Other water users in the state

IDAHO

Critically low water supplies are expected in Idaho during the summer. Record low flows are projected for rivers and streams throughout the state. Snowmelt runoff forecasts vary from only 10 percent of average for the Bear River drainage to 60 percent of normal from the Henry's Fork of the Snake River. Many smaller streams are expected to dry up by late summer.

The snow pack increased only very little during February. Normally 85 to 90 percent of the season's snowpack has accumulated by March 1. Currently, the snowpack varies from a low of 5 percent of average on the Palouse River watershed to 45 percent of normal on the Bruneau. Valley precipitation was below average again during the past month, and has been only one-third of normal since last October 1.

Reservoir storage is near average for this date, but impoundments are not expected to increase at the normal rate during the spring because of low streamflow and unusually heavy irrigation demands.

MONTANA

Water supply prospects have deteriorated the past month even with the storm activity

STORAGE IN LARGE RESERVOIRS MARCH 1, 1977

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE	BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI				UPPER COLUMBIA			
Belle Fourche	185	69	68	Chelan	676	222	137
Boysen	550	295	112	Coeur d'Alene	225	17	10
Buffalo Bill	373	171	113	Duncan	1,400	363	218
Canyon Ferry	2,043	1,727	107	Flathead	1,791	704	70
Fort Peck	19,140	15,940	122	Hungry Horse	3,428	2,326	100
Garrison	24,790	17,925	128	Kootenay	787	435	97
Hebgen	377	233	115	Lake Koocanusa	5,694	2,770	0
Keyhole	192	122	163	Lower Arrow	2,691	530	253
Lake Francis Case	5,816	3,508	96	Noxon Rapids	335	290	96
Lake Sharpe	1,900	1,748	103	Pend Oreille	1,155	230	50
Oahe	23,630	19,214	124	Roosevelt	5,232	2,938	103
Tiber	1,347	495	86	Upper Arrow	4,400	614	139
Bighorn Lake	1,356	870	109				
PLATTE				LOWER COLUMBIA			
So. Platte in CO (30)	896	570	91	Cougar	155	5.3	13
City of Denver (7)	622	432	93	Detroit	300	0	0
Colo.-Big Thompson (3)	718	349	83	Green Peter	270	0	0
Glendo	784	375	103	Hills Creek	200	0	0
Pathfinder	1,016	748	195	Lookout Point	337	0	0
Seminole	1,010	488	146	Prineville	153	96	85
				Wickiup	200	191	113
ARKANSAS				Yakima Res. (5)	1,066	831	120
Conchas	273	84	45				
John Martin	354	20	22	SNAKE			
Turquoise	130	31	0	American Falls	1,125	1,104	140
				Anderson Ranch	423	330	139
RIO GRANDE				Arrowrock	287	202	81
Elephant Butte	2,195	342	78	Brownlee	980	773	148
New Mexico Res. (4)	578	260	236	Cascade	653	357	110
				Dworshak	2,016	715	230
UPPER COLORADO				Jackson	847	598	112
Blue Mesa	830	393	0	Lucky Peak	278	87	97
Flaming Gorge	3,749	2,939	185	Owyhee	715	505	112
Navajo	1,696	1,121	93	Palisades	1,200	1,083	134
Powell	25,002	17,985	214	Warm Springs	191	83	86
Starvation	165	166	0				
LOWER COLORADO				PACIFIC COASTAL			
Havasu	619	550	102	Clair Engle	2,448	1,143	55
Mead	26,159	21,844	127	Clear Lake	440	211	93
Mohave	1,810	1,671	99	Nacimiento	350	44	22
Salt River Res. (4)	1,755	950	86	Ross	1,052	660	75
San Carlow	1,093	12	6	Upper Klamath	584	374	89
Verde River Res. (2)	318	35	24				
GREAT BASIN				CALIFORNIA CENTRAL VALLEY			
Bear	1,421	1,040	109	Almanor	1,308	621	83
Lahontan	291	174	85	Berryessa	1,602	995	64
Rye Patch	157	108	114	Bullards Bar	961	281	52
Sevier Bridge	236	118	117	Folsom	1,010	272	44
Strawberry	270	207	178	Isabella	570	65	34
Tahoe	732	165	37	McClure	1,026	210	35
Utah	884	758	125	Millerton	521	235	66
Willard Bay	193	146	120	Oroville	3,538	1,572	60
				Pine Flat	1,002	276	43
				Shasta	4,552	1,486	43

Reservoir Storage Data Provided by Bureau of Reclamation, Corps of Engineers, Geological Survey and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

near the first of March. Snowfall on the mountain watersheds was very light until the last few days in February and first few days of March. Some mountainous areas received one to four feet of new snow during this storm period.

Small mountain ranges in central Montana and the north end of the Bighorn Mountains continue to receive good precipitation.

Areas west and north of the Kootenai River and areas along the continental divide east of Lemhi Pass into Yellowstone National Park near Butte and north of Marias Pass to the Canadian border have less than 30 percent of average snowpack. Headwater areas of Gallatin, Smith, Belt, Judith, Musselshell and Shields Rivers have 50 to 70 percent average snow storage. Snow water content in the Crazy and Castle Mountains is 70 to 90 percent average.

The water equivalent at about 75% of the snow courses in Montana is minimum of record.

Most streams are forecast to have spring and summer runoff that is from the second to the fourth lowest of record. Mid- and late-season irrigation supplies are expected to be short. However, reservoir storage remains above normal and will provide much needed supplemental water to many areas.

In the Columbia Basin most streams are expected to flow at rates only slightly higher than the low years of 1941 and 1944, except the Bitterroot which is forecast to be below its previous record low.

Missouri and Yellowstone River Basin streams are forecast to yield volumes at or below their record lows, except for streams heading in the small mountain ranges of central Montana and those which flow from the Big Horn range. Snowpack conditions in these localities are better and snowmelt runoff will be well above the record lows of other areas.

NEVADA

The water supply outlook for Nevada this season continues to be very poor. Severe shortages will be experienced if present conditions continue. Streamflow forecasts are very low with several being lower than last year's streamflow.

Snow course measurements about March 1 indicate that in most areas the pack is only 15 to 25 percent of the 1958-72 average. There is no percentage increase from last month's measurements. The storms occurring near the end of the month added only small amounts of water.

On the east slope of the Sierra, the snowpack remains below last year's meager level.

On the Humboldt and Owyhee watersheds, the snowpack is only 20 to 25 percent of average and similar conditions are found on most of the other mountain areas of Nevada.

Forecasts of streamflow from the Sierra indicate record low flows should be expected. Lake Tahoe is expected to rise only 0.15 feet. Other forecasts range from 8 percent of average on the Humboldt, to 15 percent of from the Truckee, 20 percent from the Owyhee, and 23 percent from the East Fork of the Carson.

Reservoir storage is quite variable. Lake Tahoe is very low. Lahontan is slightly below normal, and Bridgeport much below normal. Rye Patch and Wildhorse are above normal for this date.

NEW MEXICO

The snowpack was improved somewhat in New Mexico by the month-end storm. Watersheds in the Sangre de Cristos Range received considerable snow. Consequently, streamflow forecasts have improved in these areas.

Streams originating on the west side of the Rio Grande still have a poor snowpack. Some snow courses have a lighter accumulation than the previous minimum of record. Streamflow from these areas will be very low.

The snowpack on the headwaters of the Rio Grande and San Juan Basins in Colorado is extremely poor, only averaging about 25% of normal. Therefore, the Rio Grande is forecast to yield only 40% of normal, and the Rio Chama only 38%. However, the near average snowpack on the Pecos Watershed makes the outlook brighter in that area. The forecast of snowmelt runoff in the Pecos is 83% of normal.

Statewide, the carryover reservoir storage is only slightly below normal. Several Rio Grande reservoirs are well above normal, but Elephant Butte contains only about three-fourths its March 1 average.

OREGON

The water supply outlook for Oregon is generally very poor. Only in areas with access to stored water will some users have normal supplies. The mountain snowpack is still at record low levels. Precipitation this past month was below normal. Reservoir storage was generally close to normal, however, many reservoirs will not fill.

The mountain snowpack is still at record low levels. Fifty-one snow courses reported new minimum-of-record March 1 measurements. Warm temperatures during the first three weeks caused a loss of water content at most snow courses. The storms during the last week of February had to make up this loss before increases could be recorded in the snowpack for March 1. The snowpack now ranges from a low of 2% of normal on Bully Creek in Eastern Oregon, to a high of 37% on McKay Creek near Pendleton, Oregon.

The dry trend Oregon has been experiencing since last September continued through February. The Willamette Valley recorded the most precipitation during the month at 63% of normal. Precipitation over the rest of the state varied from 28% of normal in Lake County, to 62% in the north central part of the state.

The soils are still very dry beneath the snowpack and will absorb more than normal amounts of snowmelt water.

Twenty-six principal irrigation reservoirs were storing 1,970,000 acre-feet of water as of March 1. This compares to the normal of 2,065,000 acre-feet for March 1. Many reservoirs will not fill, however, and this will cause water shortages for many irrigators.

Streamflow this past month continued at low levels on most streams throughout the state. Expected flow during the April-September period is very low, and may fall below previous minimums of record. Owyhee Reservoir net inflow is forecast to be only 18% of normal, and the Malheur forecast is for only 15 percent. Most other central and eastern Oregon streams are expected to yield between 20 and 40 percent of their normal quantities, except for spring-fed rivers such as the Deschutes, which is forecast to be 69% of average. The Willamette is forecast to flow at 48% of its norm, and the Rogue forecast is 59%.

UTAH

Utah's water supply outlook is still poor for those areas without reservoir storage. Snow cover ranges from 1 to 51 percent of the March 1 average. Reservoir storage is now 114% of the March 1 average, but much less than last year at this time. Streamflow forecasts range from 5 to 51 percent of the April-July average.

Snow measurements taken the last week of February show water contents below previous record lows except on the Virgin and Fremont Rivers. Statewide snow cover is 28% of the March 1 average and

ranges from 1% on the Enterprise-New Harmony drainages to 51% on the Lower Sevier.

Storage in 24 of Utah's reservoirs is 114% of the March 1 average, but well below last year at this time. Many smaller reservoirs are below average at this time.

Forecasts of spring and summer streamflow were reduced as much as 20% from February 1. Many forecasts are below 1961 low year and approaching the record low of 1934.

Forecasts now range from 5% of average for the Duchesne at Randlette, to 51% for Little Cottonwood Creek near Salt Lake. Weber River at Oakley is forecast 41% of average, Pineview Inflow 18%, Bear at Harer 10%, Logan River 35%, and Lost Creek near Croydon is forecast at 8% of the April-June average.

Provo River is forecast 15% at Hailstone and Strawberry Inflow is 14% of the April-July average.

Utah Basin streams, in addition to the Duchesne, are forecast to range from 10 to 40 percent of normal.

Price River forecasts range from 24% for Scofield Inflow to 16% at Heiner, and the Virgin River is forecast at 35%.

The Sevier River is forecast to flow at 33% at Gunnison, and the Beaver River is forecast at 36% of average at the gaging station near Beaver.

WASHINGTON

Snow measurements made in Washington continue to establish new record lows. The snow cover for the state now stands at only 17% of normal, which is only about half the previous record low. As a result, record or near record low runoff is forecast during the forthcoming snowmelt season. Reservoirs are in reasonably good shape for this time of year.

There has been a slight increase in the snowpack from last month. The better snowpacks are found in the northern part of the state and in the tributary basins of the Similkameen, Okanogan and Upper Columbia. The poorest are on the Lower Columbia Drainage and the southwest slopes of the Cascades below the Skagit drainage. The best snowpack in the state is on the Nooksack River, but is only 44% of average. The poorest is on the Cedar River drainage which has only 4% of normal.

Most reservoirs have average or above normal amounts of water in storage. Irrigation reservoirs are in good shape now, but water users will have to start withdrawing water from these reservoirs to start their irrigation operations and with this withdrawal, it is unlikely that these reservoirs will completely fill with the spring runoff.

Forecasts of spring and summer runoff now range from a low of 22% of normal for the Yakima River at Parker to a high of 71% of normal for the Columbia River at Birchbank. Puget Sound drainages are forecast to be between 40 and 50 percent of normal. The forecasts for the Columbia River at The Dalles have been lowered to 51% of normal, which is less than the previous low of 1926.

WYOMING

The Wyoming spring and summer water supply picture remains bleak for most water users without adequate reservoir storage. Below average precipitation during February provided minimal increases in the record low mountain snowpack.

Almost all snow courses on the west side of the state indicate the lowest

snowpack on record with many at less than half of the previous record lows. The snowpack is 15-30 percent of normal in the Bear and Green River drainages, 30-40 percent in the northwest corner of the state, 35-50 percent of normal in the Bighorn Mountains. The Black Hills showed a slight decrease during the last month, but still remain above normal.

February precipitation has been at or below average throughout the state with many areas receiving less than half the normal amount. The seasonal total, October through February, is now 44% below average for the state.

All streamflow forecasts have been reduced from last month. Many streamflow volumes are expected to be the lowest on record. Forecasts for the southwest corner of the state are only 20 to 40 percent of normal and the rest of the state is generally less than 60% of normal. Watersheds in the northern portion of the Bighorn Mountains will be near or slightly below normal and streamflow out of the Black Hills will be above normal.

Reservoir storage remains above normal throughout most of the state. Twenty-three major reservoirs are currently storing 8,060,000 acre-feet of water. This is 41% above the March 1 average.



EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill, Bull Lake and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in Mackay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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